

## CLAIMS

What is claimed is:

- 1    1.    A method, comprising:  
2        forming a cladding material over a substrate;  
3        lithographically patterning and etching the cladding material to obtain core  
4 regions and a spacing between the core regions that is made of the cladding  
5 material; and  
6        filling the core regions with a core material.
- 1    2.    The method of claim 1 wherein etching the cladding material comprises using  
2 an anisotropic etching technique.
- 1    3.    The method of claim 1 wherein filling the core regions comprises using a  
2 deposition technique.
- 1    4.    The method of claim 1 wherein filling the core regions comprises using a re-  
2 flow process.
- 1    5.    The method of claim 1, further comprising using a chemical–mechanical  
2 process to remove excess core material formed over the core regions and over the  
3 cladding material.
- 1    6.    The method of claim 5, further comprising forming another cladding material  
2 over the core regions and over the spacing.

1 7. The method of claim 1 wherein lithographically patterning the cladding  
2 material includes using a mask.

1 8. A method, comprising:  
2 forming a layer made of a first material over a substrate;  
3 selectively removing portions of the layer to form regions separated by a  
4 spacing that is made of the first material; and  
5 filling the regions with a second material different from the first material.

1 9. The method of claim 8 wherein the first material comprises a cladding  
2 material, wherein the second material comprises a core material, and wherein the  
3 cladding and core materials comprise part of an optical waveguide of an integrated  
4 optical device.

1 10. The method of claim 8, further comprising removing excess portions of the  
2 second material formed over the first material and over the regions.

1 11. The method of claim 10 wherein removing the excess portions comprises  
2 using a chemical-mechanical polishing technique.

1 12. The method of claim 8, further comprising forming another layer over the  
2 regions and over the spacing.

1 13. The method of claim 8 wherein filling the regions comprises using a  
2 deposition or re-flow process to fill the regions with the second material.

1 14. The method of claim 8 wherein selectively removing portions of the layer  
2 includes:

3 lithographically patterning the regions and the spacing, wherein a width of the  
4 spacing is reduced relative to a width of the regions; and

5 vertically etching the layer based on the lithographic patterning to remove  
6 portions of the first material corresponding to the region.

1 15. The method of claim 14 wherein lithographically patterning the regions and  
2 the spacing includes using a mask.

1 16. A device, comprising:

2 a spacing made of a first cladding material and formed by an etch process to  
3 remove portions of the first cladding material from core regions adjacent to the  
4 spacing;

5 a core material filled into the core regions subsequent to removal of portions  
6 of the first cladding material from the core regions; and

7 a layer made of a second cladding material and formed over the core material  
8 and over the first cladding material, including over the spacing.

1 17. The device of claim 16 wherein the first and second cladding materials  
2 comprise a similar material having a lower refraction index than the core material.

1 18. The device of claim 16 wherein upper surfaces of the core material, of the  
2 spacing, and of the first material are substantially flush.

1 19. The device of claim 16 wherein the core regions and spacing are patterned  
2 using a lithography technique.

1 21. The device of claim 16 wherein the core regions are filled with the core  
2 material using a deposition or re-flow technique.